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ENTOMOLOGICAL NEWS

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Undescribed Species of Crane-Flies from the Western United States and Canada (Dipt.: Tipulidae)

Part XII

By CHARLES P. ALEXANDER, University of Massachusetts, Amherst, Massachusetts

The preceding part under this general title was published in ENTOMOLOGICAL NEWS 60: 39–45. At this time I am discussing some additional novelties that were collected by myself in various parts of California in 1947 and 1948. The types of these species are preserved in my personal collection of the Tipuloidea.

Pedicia (Tricyphona) bidentifera new species

Allied to *simplicistyla;* thorax uniformly light yellow, unpatterned; halteres and legs pale yellow; wings pale yellow, restrictedly patterned with pale brown; male hypopygium with the interbase appearing as a powerful flattened blade, at apex split into two subequal teeth, with a smaller spine or flange on the face at near midlength.

♂. Length about 12–13 mm.; wing 10–12 mm.

Rostrum yellow; palpi brownish black. Antennae short, yellow throughout. Head light yellow.

Thorax uniformly light yellow, unpatterned. Halteres and legs pale yellow, the outer two tarsal segments darkened. Wings with the ground pale yellowish subhyaline, restrictedly patterned with darker, including the pale brown costal border that extends to the wing tip; further slightly darker spots along

the cord, origin of *Rs*, outer end of cell *1st* M_2 and over vein R_2 and the supernumerary crossvein beneath it; veins yellow, including those in the darkened areas. Venation: Radial field variable, R_{2+3+4} being present to virtually lacking, in the latter case cell R_3 subsessile; a supernumerary crossvein in cell R_3, virtually in alignment with vein R_2; *m* at or before the fork of M_{1+2}.

Abdomen with the tergites brownish yellow, paler laterally; sternites and hypopygium light yellow, the outer ends of the appendages of the latter darker. Male hypopygium with the caudal border of the ninth tergite very gently emarginate, the edge and the low lobes densely setuliferous. Basistyle extended into a stout lobe, the apex of which is densely set with pale brown spinous setae and a few longer pale setae, the latter more numerous on the mesal face, on the proximal end forming a tuft of long yellow setae; interbase appearing as a powerful flattened blade, at apex split into two subequal teeth, with a smaller spine or flange on the face at near midlength; surface of interbase with microscopic appressed setulae. Dististyle simple, longer than the apical lobe of the basistyle, constricted on outer margin at near midlength, the apex narrowly obtuse. Phallosome with the apophyses separated from the longer dark-colored aedeagus.

Habitat. CALIFORNIA. *Holotype:* ♂, Hatchet Pass, Burney, altitude 4,200 feet, July 9, 1947 (C. P. Alexander). *Paratopotypes:* 1 ♂, with the type; 5 ♂♂, August 12, 1948 (C. P. Alexander).

While generally similar to *Pedicia* (*Tricyphona*) *simplicistyla* Alexander, the present fly is quite distinct in the structure of the male hypopygium, particularly of the interbase.

Dicranota (Rhaphidolabis) tehama new species

Thorax brownish gray, the praescutum with three darker brown stripes; legs black, the femoral bases narrowly obscure yellow; wings with a grayish tinge, the stigmal area scarcely differentiated; *Sc* moderately long, Sc_1 ending approximately opposite the fork of *Rs*; *r–m* approximately one-half its own

length before the fork of *Rs*, R_{2+3} perpendicular at origin; *m–cu* at or close to fork of *M*; cell *2nd A* relatively long and narrow.

♀. Length about 7 mm.; wing 5.2 mm.

Rostrum short, brownish gray; palpi black. Antennae black throughout; flagellar segments short-oval. Head grayish brown.

Pronotum dark brownish gray. Mesonotal praescutum brownish gray, with three darker brown stripes; posterior sclerites of notum and the pleura dark gray; dorsopleural membrane dark buff color. Halteres with stem white, knob slightly more infuscated. Legs with the coxae gray; trochanters brownish gray; remainder of legs black, the femoral bases narrowly obscure yellow. Wings with a grayish tinge, the prearcular field narrowly yellow; stigmal area scarcely differentiated; veins pale brown. Venation: *Sc* moderately long, Sc_1 ending about opposite to shortly beyond the fork of *Rs*, Sc_2 at near three-fifths the length of *R* beyond the arculus; *Rs* strongly arcuated, with *r–m* from one-third to about two-thirds its own length before the fork; R_{2+3+4} subequal to the distal section of *Rs*; R_{2+3} perpendicular at origin; R_{1+2} subequal to or shorter than R_2; cell M_1 shorter than M_3; *m–u* at or close to fork of *M*; cell *2nd A* relatively long and narrow.

Abdomen elongate; tergites brown, sternites somewhat lighter; cerci elongate, horn-yellow.

Habitat. CALIFORNIA. *Holotype:* ♀, Kings Creek Meadows, Lassen Volcanic National Park, altitude 7,500 feet, July 6, 1947 (C. P. Alexander).

The most similar described regional species are *Dicranota* (*Rhaphidolabis*) *nooksackensis* Alexander and *D.* (*R.*) *nuptialis* Alexander, both of which differ conspicuously in the venation, especially of the radial and medial fields, and in the broad cell *2nd A*. The specific name, *tehama*, is that of an ancient mountain some three miles southwest of Lassen Peak, its remnants persisting as Brokeoff Mountain, Mount Diller and other parts of the former rim of the caldera.

Ormosia (Ormosia) tahoensis new species

Belongs to the *similis* group; general coloration of thorax dark brownish gray; antennae (male) of moderate length, being approximately one-fourth the length of the wing; wings with cell M_2 open by the atrophy of the basal section of M_3; male hypopygium with the phallosome very complex, especially the outer apophyses which are branched to an exceptional degree.

♂. Length about 5 mm.; wing 5.7–5.8 mm.; antenna about 1.3–1.4 mm.

Rostrum gray pruinose; palpi black. Antennae (male) of moderate length, black throughout; flagellar segments subcylindrical or slightly produced on lower face, provided with a dense erect white pubescence; verticils of basal segments long, much exceeding the segments, becoming shorter on the outer ones, small and delicate on the outer two or three. Head brownish gray.

Thorax almost uniformly dark brownish gray, the pretergites obscure yellow; lateral praescutal borders and region of the wing root obscure yellowish brown; pseudosutural foveae black. Halteres with stem weakly infuscated, the apex of knob vaguely more brightened. Legs with the coxae obscure yellow, the fore pair darker; trochanters yellow; remainder of legs brown, the femoral bases yellow. Wings with a weak brownish tinge, the stigmal region infuscated; outer part of cell *C* less evidently darkened; wing base restrictedly yellow; veins brown, yellow in the prearcular field. Venation: Cell M_2 open by the atrophy of the basal section of M_3; *m–cu* at or close to fork of *M*; vein *2nd A* sinuous on outer third.

Abdomen, including hypopygium, brownish black. Male hypopygium with the appendage of the ninth tergite nearly parallel-sided, the apex subtruncate, only weakly notched medially; lobes with fimbriations unusually short. Outer dististyle dilated outwardly, the broad apex truncated, the outer apical angle more produced; surface of style with rows of appressed blackened points, as in the group. Inner dististyle a slender straight rod, on outer margin at near midlength with a small blackened knob, beyond which the style is dilated into a slightly more widened blade, the tip a short point. Phallo-

some very complex; inner apophyses appearing as flattened blades, the outer margin near apex produced laterad into a point; outer apophyses unusually branched, including an inner axial spine and a longer outer lateral one that bears two sharp spurs, one on the upper surface, the other on the lower margin; nearer the base of the main axis with a further strong arm that is extended into two very unequal spines.

Habitat. CALIFORNIA. *Holotype:* ♂, Truckee River, along small spring-fed rill near Deep Creek, Placer Co., 5,950 feet, July 2, 1947 (C. P. Alexander). Paratopotype: 1 ♂, July 1, 1947.

While generally similar to species such as *Ormosia* (*Ormosia*) *meigenii* (Osten Sacken), the present fly is very distinct in the structure of the male hypopygium, particularly the unusually complicated phallosome.

Ormosia (Ormosia) burneyensis new species

Belongs to the *similis* group; mesonotum dark reddish brown, the pleura more yellowed; antennae (male) elongate, exceeding one-half the length of wing, the flagellar segments nodulose, the basal swellings of the individual segments long-fusiform; cell M_2 open by the atrophy of the basal section of M_3; male hypopygium with the mesal margin of the basistyle produced into a blackened bispinous structure; phallosome on either side of aedeagus produced into two spines, the outer one small.

♂. Length about 4–4.5 mm.; wing 4.5–5.4 mm.; antenna about 3–3.2 mm.

Rostrum and palpi brown. Antennae (male) elongate, exceeding one-half the wing; scape and pedicel yellow, flagellum dark brown; flagellar segments long-fusiform, the basal swellings conspicuous, provided with dense whorls of long pale setae that exceed the segments in length and are considerably longer than the dark verticils. Head dark brown.

Pronotum brown, the pretergites whitened. Mesonotum dark reddish brown; pseudosutural foveae reddish; pleura more yellowed. Halteres pale. Legs with the coxae and trochanters yellow; remainder of legs brownish yellow, the outer tarsal segments slightly darker. Wings with a weak brownish tinge, the

stigmal region slightly darker, the prearcular field more yellowed; veins brown, yellow at the wing base. Venation: Cell M_2 open by the atrophy of the basal section of M_3; *m–cu* at fork of *M;* vein *2nd A* sinuous on distal third.

Abdomen, including hypopygium, dark brown. Male hypopygium with the appendage of the ninth tergite unusually wide, the apical emargination very broad and shallow, the lateral lobes correspondingly stout and obtuse, with long pale fimbriations. Outer dististyle with the rows of scabrous points reduced, more or less restricted to the outer fourth. Inner dististyle a little longer, the apex obtuse, weakly darkened. Basistyle on mesal margin produced into a blackened bispinous structure, the lower spine smooth, the outer or axial one stouter, bladelike, the outer margin and apex microscopically serrulate. Phallosome stout, abruptly narrowed into the aedeagus, at point of narrowing each outer lateral angle produced into two spines, the outer one small, the inner long and straight, decussate across the midline.

Habitat. CALIFORNIA. *Holotype:* ♂, Hatchet Pass, Burney, altitude 4,200 feet, July 9, 1947 (C. P. Alexander). *Paratopotype:* ♂. *Paratypes:* ♂♀, Castle Crags State Park, Shasta Co., altitude 2,050 feet, August 13, 1948 (C. P. Alexander).

The most similar regional species is *Ormosia* (*Ormosia*) *heptacantha* Alexander, which differs most evidently in the structure of the male hypopygium, as described.

Ormosia (Ormosia) pernodosa new species.

Allied to *albertensis;* general coloration of mesonotum reddish brown, the pleura clearer yellow; antennae of male elongate, exceeding one-half the length of body; flagellar segments very strongly nodose, with long erect pale setae on the enlarged part, with approximately the outer half of the segment glabrous; Anal veins divergent.

♂. Length about 3.5–3.6 mm.; wing 4–4.2 mm.; antenna about 2 mm.

♀. Length about 4–5 mm.; wing 4.5–5.5 mm.

Rostrum yellow; palpi black. Antennae (male) long, exceeding one-half the body; scape obscure yellow, the remaining

segments brownish black; flagellar segments unusually nodose, each with a major basal enlargement that is provided with long outspreading setae, additional to a single even longer verticil; longest ordinary seta about as long as the segment; verticils approximately one-third to one-half longer than the segment; distal half or less of segment narrowed, glabrous. In *albertensis,* the segments are fully as long but are narrower basally and not so strongly nodose, with the ordinary setae shorter and distributed over the entire segment with the exception of the outer fifth or sixth. Head infuscated on vertex, the front and orbits yellow.

Pronotum and pretergites yellow. Mesonotum reddish brown, the lateral praescutal borders yellow. Pleura and pleurotergite clearer yellow. Halteres infuscated. Legs with the coxae and trochanters yellow, remainder of legs dark brown. Wings with a brownish tinge, the stigmal region somewhat more infuscated, the basal portions a trifle more yellowed; veins brown. Venation: Sc_1 ending shortly beyond R_2, Sc_2 at about one-third the length of Rs; cell M_2 open by the atrophy of the basal section of M_3; *m–cu* close to fork of M; anal veins divergent.

Abdominal tergites dark brown, the sternites in male more yellowed; genitalia of both sexes yellow. Male hypopygium about as in *albertensis* or *onerosa.*

Habitat. CALIFORNIA. *Holotype:* ♂, Truckee River, along small spring-fed rill near Deep Creek, Placer Co., 5,950 feet, June 30, 1947 (C. P. Alexander). *Paratopotypes,* ♂♂; paratypes, ♂♀, Upper Echo Lake, near Freeborn Cabins, 7,500 feet, July 4, 1947 (C. P. Alexander).

The various species that center about *Ormosia* (*Ormosia*) *mesocera* Alexander, including besides the latter, *O.* (*O.*) *albertensis* Alexander, *O.* (*O.*) *onerosa* Alexander and the present fly, are all closely inter-allied, as well shown by the very uniform structure of the male hypopygium. However there are well marked differences in the structure of the antennae, ranging from the short inconspicuous structures of *onerosa* to the condition found in the present fly. The most nearly allied species is *albertensis* where the basal swellings of the flagellar segments are much less developed, as described above.

First Record of Adult Mountain Midges from North America. (Diptera: Deuterophlebiidae)*

By Robert W. Pennak, Department of Biology,
University of Colorado

Although the larval and pupal stages of mountain midges have been collected from the substrates of rapid streams in Colorado, Utah, Wyoming, Oregon, and California. (probably all *Deuterophlebia coloradensis* Pennak), the imagoes have not heretofore been recorded from North America. Of the several Asiatic and Japanese species, the imagoes of only three have been briefly described.

At 8:00 A.M. on July 19, 1948, however, the writer was fortunate enough to collect about 200 dying, dead, and disintegrating adult males and 2 adult female *D. coloradensis* floating in small side eddies of North St. Vrain Creek near the town of Lyons, Colorado, at an altitude of 5320 feet. Many larvae and pupae had previously been collected from this foothills stream.

Although the streamsides in the area and farther upstream were examined carefully, not a single adult specimen could be found on the vegetation, on the rocks, or in the abundant cobwebs. This fact strengthens the contention of other investigators that mountain midges are poor fliers that cannot do more than flutter about weakly and briefly above the water after emergence. They soon fall to the surface of the water and die. Late morning and afternoon collections from North St. Vrain Creek have never yielded imagoes, and it appears probable that they emerge only in the early morning hours. Nothing is known about their copulation and oviposition habits.

Detailed descriptions of the adult male and female are in preparation.

* Contribution No. 16, Limnology Laboratory, Dept. of Biology, University of Colorado.

Two New Polydesmoid Diplopods

By NELL BEVEL CAUSEY, University of Arkansas,
Fayetteville, Arkansas

Type specimens of the species described in this paper have been deposited in the collection of the Academy of Natural Sciences of Philadelphia. The collections were made by the author.

EURYURIDAE

Auturus florus n. sp. Figs. 1 and 2.

This species is close to *A. mimetes* in size, coloration, and the general shape of the gonopods. It differs from *A. mimetes* in that the lamina ectad of the hooked blade of the gonopods is roughly pointed rather than rounded.

The color of adult specimens is dark grey with orange keels and median spots. Antennae, legs, and underparts are white.

The last tergite is roughly quadrilateral with the caudal margin slightly convex and the sides subparallel. The keels of the 18th and 19th tergites are rounded; posterior corners of the preceding tergites are a little acute. The keels are thickened on the edges, with the pore lateral and about midway, its site marked by a slight swelling or sometimes by a slight excavation. The usual small tooth is just posterior to the anterior corner of the keels.

The gonopods *in situ* hang down, directed slightly forward, with the amber colored ends overlapping. Distally they are flattened with the edges forming a rough trough open medially and terminally. The distal margin has a thin rounded hooked process medially and a longer rough peak laterally. The distal one-fifth of the gonopods is glabrous and of a bright amber color; the remainder is the usual cream color and the surface is setose, thickly so on the medial and ventral surfaces.

Length of male holotype 29.5 mm., width 3.4 mm. Length of female allotype 30 mm., width 4 mm.

Locality. ARKANSAS: Hemmed-in-Hollow, Compton, Newton County, July 13, 1940. In the collection there were three

males, four females, 15 larvae of the 7th stadium and six of the 6th stadium. Others have been taken at Pyatt in Marion County and at several places in Washington County.

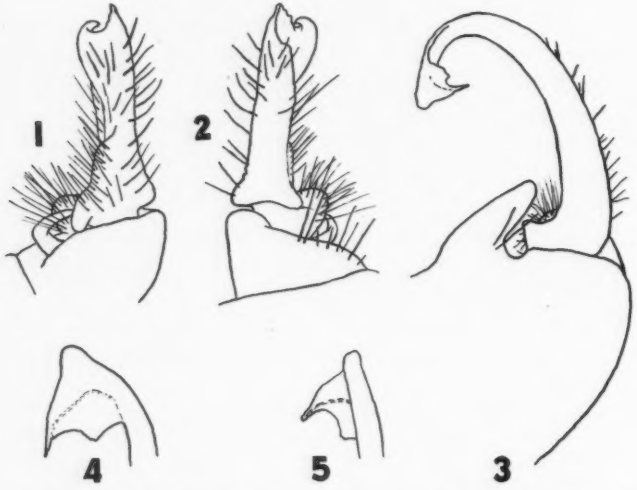

FIG. 1. *Arturus florus* n. sp. Left gonopod of male holotype, caudal view, × 28.
FIG. 2. Same, cephalic view, × 28.
FIG. 3. *Deltotaria tela* n. sp. Left gonopod of male holotype, subcephalic view, × 28.
FIG. 4. Right gonopod of male holotype, distal end of blade, cephalic view, × 55.
FIG. 5. Same, subcaudal view, × 55.

XYSTODESMIDAE

Deltotaria tela n. sp. Figs. 3, 4, and 5

This species resembles *D. brimleii,* but it can be distinguished by the differences in the thin expanded end of the gonopods. See figs. 3, 4, and 5. The gonopods of the male paratype showed great similarity to those of the holotype at low power magnification, but at medium power the differences were very noticeable.

The preserved specimens are brown, and the light colored keels are confluent with wide bands of color across the posterior margins of the tergites.

The dorsum is moderately arched. The keels are wide, slightly overlapping; their margins are thickened, and the pores are on the upper surface behind the middle. The head and first three segments are much narrower relatively than in most of the other broad flat members of this family. Posterior coxae are sharply spined; sternites are unarmed in the male, but very bluntly spined in the female.

Length of male holotype 36 mm., width 8.2 mm., width of collum 5.6 mm. Length of male paratype 32 mm., width 8 mm., width of collum 5.5 mm. Length of female allotype 38 mm., width 10.2 mm., width of collum 6.5 mm. Another mature female in the collection tentatively assigned to the species has the following dimensions: length 34 mm., width 7 mm., width of collum 5 mm.

Locality. NORTH CAROLINA: Bent Creek Forest Experiment Station. April 30, 1939.

Subventral Tubercles of Saturnioid Larvae—A Supplementary Note

By EUGENE G. MUNROE, Institute of Parasitology, Macdonald College, Quebec

Since the appearance of my recent remarks on this subject I have received two very interesting papers (Travassos and d'Almeida, 1937; Travassos, 1946), which help to fill an important gap in the data then available to me. These papers contain very full descriptions of the larvae of several species of Neotropical Saturnioidea, including those of three species of Agliinae: *Dysdaemonia tamerlan* Maassen & Weymer, *Machaerosema martii* (Perty), and *Copiopteryx semiramis* (Cramer). In all three species the subventral tubercles seem to be lacking in the first and all subsequent instars. A possible

exception is in the early instars of *Dysdaemonia,* in which there is said to be a transverse row of prothoracic spines approximated to the head; this may be compared with Packard's (1914:9) description of the first instar larva of *Arsenura richardsoni,* in which there are said to be two subspiracular pairs of tubercles on the prothoracic segment. In both cases a further study of the homologies is desirable.

The remarkable dorsal armature of the young larvae strongly suggests an affinity with the Citheroniinae, and this relationship has been accepted by most recent authors. The similarity to the larva of *Aglia* is very close, and the subfamily is probably a natural one. If this is so, its geographical distribution forms a remarkable parallel to that of the Dismorphiinae, with a restricted and probably primitive genus in the Palearctic region, and a relatively diverse assemblage of strikingly specialized forms in tropical America. The larvae of the Agliinae must be considered more specialized than those of the Citheroniinae not only in the complete suppression of the armature in the final instar but also in the absence of the subventral and ventrolateral rows of tubercles in the earlier stages of development.

In the paper by Travassos and d'Almeida some further Saturnioid larvae are described. *Citheronia phoronea* (Cramer) and *Syssphinx molina* (Stoll) lack the subventral tubercles on all segments in the final instar. The more dorsal series are also considerably reduced in *S. molina,* but in *C. phoronea* these seem to be entirely normal. These two species would thus differ from the Citheroniinae listed in my table.

Two Hemileucinae agree well with those already listed: *Automeris acuminata* Maassen & Weymer has subventral tubercles on thoracic segments 1 to 3 and abdominal 1, 2, and 7 to 9; *Dirphia multicolor* Walker has them on thoracic 1 to 3 and abdominal 1, 2, 7, *and* 9. Both species are described from the fifth (final) instar.

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A New Grass Aphid from Utah

By G. F. KNOWLTON and L. L. HALL
Utah State Agricultural College, Logan

The writers are indebted to Professor M. A. Palmer for calling attention to this apparently undescribed aphid. At times this species has been found to be moderately abundant in meadows where collected.

Thripsaphis utahensis n. sp.

Apterous vivipara: Body color orange to yellowish orange; body 1.9 to 2.03 mm. long; width of abdomen .69 to .725 mm. Frontal tubercles lacking; wart like projection on vertex .05 mm. long; antennae 1.2 to 1.3 mm. long, pale; antennal III, .33 to .36 mm. long, without sensoria; IV, .173 to .206 mm. long; V, .206 to .25; VI, .138 to .14 plus .121 to .138 mm.; unguis shorter than base of VI; ocular tubercles absent; hind tibiae .55 to .65 mm. long and swollen distally; hind tarsi .138 to .155 mm. long; cornicles mere rings; cauda knobbed; anal plate bilobed; the eighth abdominal tergite almost covering cauda.

Alate vivipara: Body orange with dusky lateral areas having a somewhat beaded effect, 1.47 to 1.68 mm. long and .57 wide across the abdomen; vertex very prominent, equaling at least distal end of antennal I; antennae dusky; antennal III, .38 to .43 mm. long and with 7 to 9 circular sensoria; IV, .206 to .26; V, .2 to .258; VI, .138 plus .121 mm. long; rostral IV + V, .086 long, obtuse; wing veins dusky; legs dusky to blackish; hind tibiae .65 to .69, thickened at distal end; tarsi .12 to .13; cor-

nicles pore-like with distinct rim; cauda dusky, knobbed, .21 long, with distal portion somewhat quadrangular; anal plate bilobed.

Collection data: Collected in meadow sweeps made west of Brigham City, May 24, 1945, and Logan meadows, October 15, 1943; Corinne, July 10, 1935; Strawberry Reservoir, July 25, 1945; Devil's Slide, July 24, 1945, in Utah. All material was collected by G. F. Knowlton. Type in the U. S. National Museum; paratypes in the collection of the senior writer.

Taxonomy: *Thripsaphis utahensis* n. sp. aptera differ from *T. verrucosa* Gill. in being orange instead of greenish yellow, and in lacking sensoria on antennal III.

Current Entomological Literature

COMPILED BY RAYMOND Q. BLISS AND R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1949 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

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Review

MEDICAL ENTOMOLOGY, Second Edition; by Robert Matheson; Comstock Publishing Company, Inc., Ithaca, New York; January 1950; 612 pp., ill.; $7.50.

Medical Entomology is an anomalous science which as usually defined includes within its boundaries at least portions of several other sciences, and is a subject on which it is practically impossible to obtain all of the necessary correlated information. Professor Matheson with his long teaching experience has developed, in at least certain portions of the science, the insight which is essential to those working or interested in the field, and much of this has been made available in the present work.

This, the second edition of the book, is completely rewritten following the form of the original edition and includes numerous additional illustrations. Progress in the field is so rapid that any book of this kind is naturally behind the most recent discoveries. This has been duly noted by the author who states that he has attempted to bring together the data available by the end of 1948, a statement which should prove helpful to those desiring to check for the most recent developments. This available information is scattered in such a variety of journals, mainly medical and entomological, but also in those covering more general fields, as well as in separate works, special reports, bulletins and government publications in many different languages that it is a tremendous undertaking to try to bring together the more important facts so that they may be presented in a single volume. A number of the aspects covered in the book are themselves the subject of large separate studies or of well established serial publications.

The present volume deals with the subject from the entomologists' aspect of the problems involved, leaving almost all of the effect on humans to the medical profession. Such parasitology as is included is only that necessary to understand the transmission of pathogens.

Particularly stressed is the taxonomy and morphology of those insects, and certain related groups of arthropods, which either affect man directly by their habits or which act as vectors or carriers of organisms pathogenic for man. Sufficient morphology is discussed, particularly under the various major groups, to give one a general picture of the group, to use the keys presented and to understand the mode of transmission of pathogens. This latter, of course, necessitates in almost all cases a

good working knowledge of the morphology and mode of action of the mouthparts and digestive system. In most cases keys are given to separate at least the more important forms that occur in North America. Some of these keys are not strictly dichotomous and it is believed that this may cause some confusion for persons not moderately well acquainted with insect taxonomy. Although in most cases structures mentioned in the text are well illustrated, a short glossary would be helpful to many of those for whom the volume is intended.

General life history information and bionomics are discussed under each major group and then, in most cases, additional more detailed information concerning the more important forms is presented. This style of treatment is used for those found in North America and in some groups for those of equal or of greater importance in other portions of the world. Following this is a section on the relation of the forms discussed to diseases. Most of the major diseases involved are treated in a short summary of the methods of transmission; the known or suspected vectors, reservoirs and hosts are also listed. It is in the information included under bionomics and the relation to disease that so much has been accomplished in recent years. In these sections the author and year are often cited in relation to findings or conclusions but unfortunately in some cases it is not possible to find the complete reference in the bibliographies. This omission will cause some inconvenience to those with libraries available but places those without extensive bibliographic facilities at a distinct disadvantage.

All of the chapters have selected bibliographies as it would be impossible to make any attempt at completeness in a work of this size. This selection appears to be moderately well balanced but does have the limitation above noted, as well as that of including some references that could readily be omitted.

This book is in an easily readable form but unfortunately a number of editorial lapses are noted. In addition the continuity occasionally is not what might be desired. All in all it is a worthwhile addition to the field of Medical Entomology and should prove to be of value to most of those interested in any way in this field.—J. W. H. REHN.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

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